CLAIMS

What is claimed is:

1. A digital adaptive equalizer for a data communication path, comprising:

a first programmable filter capable of being programmed to implement any of a plurality of filter transfer functions;

a filter selector to select any one of said plurality of filter transfer functions for said first programmable filter; and

a second digital filter receiving an output from said first programmable filter.

2. The digital adaptive equalizer for a data communication path according to claim 1, wherein said first digital filter comprises:

an infinite impulse response filter.

3. The digital adaptive equalizer for a data communication path according to claim 1, wherein said second digital filter comprises:

a finite impulse response filter.

4. The digital adaptive equalizer for a data communication path according to claim 1, wherein:

said second digital filter adapts a transfer function to best fit an input data signal.

5. The digital adaptive equalizer for a data communication path according to claim 4, wherein:

said transfer function is adapted based on a least mean square algorithm.

6. The digital adaptive equalizer for a data communication path according to claim 1, wherein said data communication path comprises one of:

a T1 communication path; and

an E1 communication path.

7. The digital adaptive equalizer for a data communication path according to claim 6, wherein:

said data communication path is formed by a twisted pair.

8. The digital adaptive equalizer for a data communication path according to claim 6, wherein:

said data communication path is formed by a coaxial cable.

9. The digital adaptive equalizer for a data communication path according to claim 6, wherein:

said data communication path is formed by a wireless RF medium.

10. The digital adaptive equalizer for a data communication path according to claim 1, further comprising:

an analog-to-digital converter to digitize a received substantially raw T1/E1 signal for input to said digital adaptive equalizer.

11. The digital adaptive equalizer for a data communication path according to claim 1, wherein:

said plurality of transfer functions in said first digital filter are formed by a selection of any of at least four sets of coefficients available to said first digital filter.

12. The digital adaptive equalizer for a data communication path according to claim 11, wherein:

one of said at least four sets of coefficients is selected based on a determination of a least amount of error in a received data

5   signal.

13. The digital adaptive equalizer for a data communication path according to claim 11, wherein:

an initial value of said at least four sets of coefficients is set

10   to an autocorrelation function of an amplitude mark inversion, return to zero signal.

14. A method of digitally equalizing a received T1/E1 data signal, comprising:

15   firstly filtering said received T1/E1 data signal using a first digital filter; and

adaptively adjusting an output of said first digital filter to accurately match an inverse response of a transmission channel used to transmit said received T1/E1 data signal.

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15. The method of digitally equalizing a received T1/E1 data signal according to claim 14, further comprising:

detecting a periodic pattern in said received T1/E1 data signal.

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16. The method of digitally equalizing a received T1/E1 data signal according to claim 15, further comprising:

freezing said adaptive adjustment when a periodic pattern is detected.

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17. The method of digitally equalizing a received T1/E1 data signal according to claim 14, wherein:

said firstly filtering performs an infinite impulse response filter transfer function.

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18. The method of digitally equalizing a received T1/E1 data signal according to claim 14, wherein:

said adaptively adjusting step selects and implements one of a plurality of transfer function coefficients available for said digital filter.

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19. The method of digitally equalizing a received T1/E1 data signal according to claim 18, wherein:

an initial value of said plurality of transfer function coefficients is set to an autocorrelation function of an amplitude mark

15   inversion, return to zero signal.

20. The method of digitally equalizing a received T1/E1 data signal according to claim 14, further comprising:

secondly filtering said firstly filtered received T1/E1 data

20   signal.

21. The method of digitally equalizing a received T1/E1 data signal according to claim 14, wherein:

said secondly filtering performs a finite impulse response

25   transfer function on said firstly filtered received T1/E1 data signal.

22. The method of digitally equalizing a received T1/E1 data signal according to claim 20, further comprising:

adaptively adjusting coefficients for said finite impulse

30   response transfer function on a basis of a best fit algorithm.

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23. The method of digitally equalizing a received T1/E1 data signal according to claim 22, wherein:

said best fit algorithm is a least mean square algorithm.

24. Apparatus for digitally equalizing a received T1/E1 data signal according to claim 23, comprising:

means for firstly filtering said received T1/E1 data signal using a first digital filter; and

means for adaptively adjusting an output of said first digital filter to accurately match an inverse response of a transmission channel used to transmit said received T1/E1 data signal.

25. The apparatus for digitally equalizing a received T1/E1 data signal according to claim 24, wherein:

said firstly filtering performs an infinite impulse response filter transfer function.

26. The apparatus for digitally equalizing a received T1/E1 data signal according to claim 24, wherein:

said means for adaptively adjusting selects and implements one of a plurality of transfer function coefficients available for said digital filter.

27. The apparatus for digitally equalizing a received T1/E1 data signal according to claim 24, further comprising:

means for secondly filtering said firstly filtered received T1/E1 data signal.

28. The apparatus for digitally equalizing a received T1/E1 data signal according to claim 24, wherein said means for secondly filtering comprises:

a finite impulse response transfer function on said firstly filtered received T1/E1 data signal.

29. The apparatus for digitally equalizing a received T1/E1 data signal according to claim 28, further comprising:

means for adaptively adjusting coefficients for said finite impulse response transfer function on a basis of a best fit algorithm.

30. The apparatus for digitally equalizing a received T1/E1 data signal according to claim 29, wherein:

said best fit algorithm is a least mean square algorithm.